Commonwealth of Kentucky
Division for Air Quality

PERMIT STATEMENT OF BASIS

Conditional Major/Synthetic Minor Permit No. F-99-013 (Revision 2)
VMV ENTERPRISES, INC.
1300 KENTUCKY AVE., PADUCAH, KY
February 11, 2002
KEITH METZKER, REVIEWER
Plant I.D. # 21-145-00019
Application Log # 54154

SOURCE DESCRIPTION:

The source repairs and completely overhauls train locomotives and other train cars. The source has different repair processes. Welding, cleaning, engine testing, sand blasting, painting, and other repair work is done.

VMV mostly repairs locomotives but may repair other railroad cars. The process can be as simple as patching and doing a paint job or as in depth as a complete dismantle and repair or replacement of every part. Due to the nature of the process, different parts of the repair work are done independently. For instance, once a locomotive is brought into the repair area, the engine may be removed for repair, welding may be performed on the shell, hand railing may be removed and reshaped in a furnace, electrical work may be performed, and other repairs may be performed. Since different people and equipment are used to make each of the repairs, the repairs can be performed simultaneously. Some painting of individual parts is performed as the parts are repaired but exterior painting is only performed after the other repair work is finished. Once the process is finished, the locomotive or train car regains operability and market value.

In 2000 the source applied to replace with a old Rotoblast machine with a new one, modify 3 heat treatment furnaces to use natural gas (2 of the furnaces were previously inoperable), construct an additional locomotive paint booth, modify the existing locomotive paint booth to use a filter type control device instead of a water wall, and add 2 makeup air heaters to the source. Additionally, recognized errors in F-99-013 were corrected.

Other minor changes have also been allowed between August 2000 and the date of this document. The source was allowed to change some paint guns, change some emission factors (based on test results), and add a couple of small paint guns. F-99-013 (Revision 2) will make the source wide permit current.

COMMENTS:

Type of control and efficiency

EP01 is an open face spray booth with a HVLP spray gun.

Transfer efficiency has been assumed to be 40% because of the type of gun used and the size of the items painted.

Although capture is probably around 90%, it has been assumed to be 100% because most PM not captured will settle out in the building containing the booth.

Test data supplied shows that filters utilized will achieve at least 98% PM control efficiency.

EP02 is for outdoor spray can and small gun painting.

Transfer efficiency has been assumed to be 25%.

PM emissions are assumed to have a natural control efficiency of 75% unless in a booth (see control efficiency for EP01, EP09, EP20, EP21, and EP25).

Any testing would have to be done through artificial tests (in a booth simulating field conditions). Assumptions would have to be shown to be grossly incorrect (given the assumed maximum usage rate provided in the application) before compliance demonstration would persuade the division that testing is required.

EP03 is 2 Vacublast units.

Both units use a closed system with a single cyclone and a fabric filter to control PM emissions. VMV has reported that the manufacturer estimates a 99% PM control efficiency. Information has also been provided to indicate that approximately 50% of the material captured by the control device is larger than 75µm and has a specific gravity of approximately 2.5. Based on this information, these emissions will fall out in the building. Therefore, a 50% building capture has also been assumed.

EP04 is a Rotoblaster unit.

In 2000, the old unit was replaced by a new one. A closed system with a paper cartridge filter is used to control PM emissions. The manufacturer has estimated PM control efficiency in excess of 99.9%.

EP05 is a sandblasting booth.

A large enclosed building and 4-26,000 ACFM baghouses are used to control PM emissions.

Only 3 of the baghouses need to be operated when blasting.

The building has been assumed to capture 95% of the PM emissions.

The remaining 5% of the PM emissions have been assumed to be captured by the baghouses.

Each baghouse has been assumed to have 99% PM control efficiency.

EP06 is for arc welding.

No controls are present.

Emissions inside of any semi-enclosed building will be controlled by the building. The control efficiency has been assumed to be 75%.

EP07 is for 3 heat treatment furnaces.

No controls are present.

Natural gas is now burned in the furnaces. Previously diesel fuel was burned. The fuel switch will reduce health risks from formaldehyde formation.

Type of control and efficiency (continued)

EP08 is 3 boilers.

Natural gas is the only fuel to be used in each boiler (this will control PM emissions).

EP09 is 2 large enclosed (100% capture assumed) paint booths used for painting locomotives and other large items.

One of the booths is scheduled to be constructed around June 2000. This will allow for painting of larger locomotives. It will also allow for future increased capacity.

The older booth is scheduled for modification to filters instead of the original water walls.

Transfer efficiency has been assumed to be 65% because of the type of gun used and the size of the items painted. The large transfer efficiency has the effect of reducing PM emissions.

Since AP-40 p. 865 states that 95% efficiency is good for water walls, a 90% control efficiency has been assumed if water is flowing in a sheet. Proper maintenance and operation are required for sheeting of the water.

Once the water walls are removed, both booths will have a combination of blanket and bag filters to control PM emissions. VMV has reported these units as being 99.9% efficient at removing PM emissions. Since the estimated control efficiency is common for the type of control device listed, 99.9% PM control efficiency has been assumed.

No VOC controls are present.

EP10 is for the direct heat units.

Two additional make-up air units were installed in 2000. Natural gas is used (this will control PM emissions) but not required.

EP11 is for the haul roads.

Wet suppression is to be used on the gravel roads (70% PM control efficiency assumed).

Routine cleaning of paved roads should also be done (90% PM control efficiency assumed).

EP13 is for the cold cleaning degreasers.

Tank covers, internal drainage boards, and other measures are used to control VOC emissions. No control efficiency has been assigned but lower usage rates result in a VOC control.

EP17 is for a vacuum pressure impregnator, 2 dip tanks for sealing traction motors, and 5 ovens.

Natural gas, electricity, and steam are used to heat the ovens and PM emissions are controlled through use of these heating materials (this controls PM emissions).

No other controls are present.

EP18 is for testing of locomotive engines.

No controls are present.

EP19 is for rod and head spraying.

Transfer efficiency has been assumed to be 25%.

Although capture is probably around 90%, it has been assumed to be 100% because most PM not captured will settle out in the building where the spraying is being done.

Filters shall be installed to control PM emissions. VMV supplied test data to show that the filters to be used achieve at least 98% control efficiency.

Type of control and efficiency (continued)

EP20 is a large open face spray booth using a HVLP gun or an air-assist spray gun to paint engines.

Transfer efficiency has been assumed to be 65% because of the type of gun used and the size of the items painted.

Although capture is probably around 90%, it has been assumed to be 100% because most PM not captured will settle out in the building containing the booth.

VMV supplied test data to show that the filters being used achieve at least 97% PM control efficiency.

EP21 is spray painting (other than spray can painting) outside of a permanent booth.

Transfer efficiency has been assumed to be 65% because of the type of gun used and the size of the items painted.

Essentially, an enclosed booth must be approximated to paint outside of any of the permanent booths (except for spray can painting). Smoke tube observations will be used to verify that the temporary booth is enclosed (96% PM capture is assumed).

At least 20 air changes through a HEPA filters will be used to ventilate the temporary booth (99.9% PM control efficiency is estimated from the manufacturer).

EP23 is for petroleum storage tanks.

These tanks have no special controls.

EP24 is a blasting booth.

A large enclosed building and a 76,000 CFM baghouse are used to control PM emissions.

The building has been assumed to capture 95% of the PM emissions.

The remaining 5% of the PM emissions have been assumed to be captured by the baghouse.

The baghouse has been assumed to have 99% PM control efficiency.

EP25 is an enclosed (100% capture assumed) building with 2 HVLP guns used to paint locomotive parts.

Transfer efficiency has been assumed to be 50% because of the type of gun used and the size of the items painted.

2-32,500 scfm ventilation systems with cotton fiber filters are used to control PM emissions. The manufacturer reports an arrestance value exceeding 90% and a PM control efficiency of 99% has been assumed.

Emission factors and their source

In all spraying, if a pollutant is used, it has been assumed to be emitted unless recovered. Transfer efficiency and add on controls are the only other reductions to spraying emissions.

Welding emission factors are from AP-42.

All natural gas combustion emission factors are from AP-42.

Emission factors and their source (continued)

Diesel engine combustion emission factor for formaldehyde is from Locating and Estimating Air Emissions from Sources of Formaldehyde (Revised). VOC, CO, and NO_x emission factors are based on a combination of test results and literature. Turbo engines at the source were tested to demonstrate VOC, CO, and NO_x emission factors. Blower engines were assumed to have different emission factors for VOC and NO_x. The blower engine VOC emission factor is from Procedures for Emission Inventory Preparation – Vol. IV: Mobile Sources. The blower engine NO_x emission factor is based on literature that the source submitted (this reviewer believes that the emission factor is representative). The PM emission factor is from Procedures for Emission Inventory Preparation – Vol. IV: Mobile Sources. All other emission factors for the diesel engine testing are from Exhaust Emission Factors for Nonroad Engine Modeling – Compression-Ignition. Test results will be considered above all other guidance if performed in accordance with division policy.

Haul road emissions have been estimated based on information provided to the division and are based on AP-42 emission factors. VMV has asserted that traditional monitoring and record keeping will be unduly burdensome. The division proposed setting actual emissions equal to the potential emissions and VMV accepted (in a phone conversation with Nathan Heinrich) this method for estimating emissions. Any physical changes reported to the DAQ (such as paving) will be used to lower the potential and actual emissions.

At EP17, the emission factor for PDG 600 Dap Polyester Resin is based on test results provided by VMV in the application. Use does not equal emission because a polymerization reaction occurs. Test results were also provided for the PDG 433-75-VTC Polyester Resin but the results were not consistent with the VOC content of the material. Except for the PDG 600 Dap Polyester Resin, all VOCs used have been assumed to be emitted. If testing is done and the testing conclusively demonstrates that other materials used at EP17 definitely do not have VOC emissions equally corresponding to VOC usage, then other emission factors should be established and used.

Tank emission factors are based on an analysis of the information provided in the application. The program TANKS 3.1 was used to perform the analysis.

Applicable regulations

EP01 is subject to 401 KAR 61:020, Existing process operations, because it was commenced before July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because it was commenced before February 4, 1981. 401 KAR 61:132, Existing miscellaneous metal parts and products surface coating operations, does not apply to this point because it is not located in a nonattainment area.

Applicable regulations (continued)

EP02 is subject to 401 KAR 61:020, Existing process operations, because the process operation associated with the spray can and small gun painting was commenced before July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because it commenced before February 4, 1981. 401 KAR 61:132, Existing miscellaneous metal parts and products surface coating operations, does not apply to this point because it is not located in a nonattainment area.

EP03 is subject to 401 KAR 59:010, New process operation, because both units were commenced after July 2, 1975.

EP04 is subject to 401 KAR 59:010, New process operations, because the unit commenced operation in 2000.

EP05 is subject to 401 KAR 59:010, New process operations, because the booth will be modified in 1999.

EP06 is subject to 401 KAR 61:020, Existing process operations, because the welding process was commenced before July 2, 1975. Since manganese and nickel emissions have been calculated below acceptable risk levels, 401 KAR 63:020, Potentially hazardous matter or toxic substances, does not apply.

EP07 is subject to 401 KAR 59:010, New process operations, because the units will be modified to burn natural gas in 2000. 401 KAR 59:260, New blast furnace casthouses, does not apply because EP07 does not meet the definition of a blast furnace casthouse. Switching to natural gas will minimize estimated formaldehyde emissions, therefore, no limitations result to control or reduce formaldehyde emissions.

EP08 is subject to 401 KAR 59:015, New indirect heat exchangers, because each boiler has a heat input capacity greater than one million BTU/hr and was commenced after August 9, 1972. The boilers are not subject to 40 CFR 60 Subpart Dc, Standards of performance for small industrial-commercial-institutional steam generating units, because all were commenced before June 9, 1989 and only one of the units was large enough to otherwise qualify for applicability to the standard.

Until modification on the old booth at EP09 is started, the old booth is subject to 401 KAR 61:020, Existing process operations, because it was commenced before July 2, 1975. However, EP09 will be subject to 401 KAR 59:010, New process operation, because the current booth will be modified to utilize a filter unit instead of the water walls and the second booth was constructed in 2000. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because the source has taken permit limitations to remain below the regulation emission trigger level.

EP10 is subject to no regulations.

EP11 is subject to 401 KAR 63:010, Fugitive emissions.

EP13 is subject to no regulations. 401 KAR 59:185, New solvent metal cleaning equipment, does not apply to VMV because the area is attainment. 401 KAR 59:185 would apply if VMV becomes a major source for VOC or the area becomes nonattainment.

Applicable regulations (continued)

EP17 is subject to 401 KAR 59:010, New process operation, because the process was last modified after July 2, 1975. It is unclear if 401 KAR 59:190, New insulation of magnet wire operations, and 401 KAR 61:100, Existing insulation of magnet wire operations, would apply if VMV was major or in a nonattainment area. Not enough information was given to determine if magnet wires are being insulated. This is irrelevant since VMV is neither major or in a nonattainment area (possible future concern).

EP18 is subject to 401 KAR 59:010, New process operation, and 401 KAR 61:020, Existing process operations. This is because test cell A was commenced before July 2, 1975 and test cell B was commenced after July 2, 1975.

EP19 is subject to 401 KAR 59:010, New process operation, because not enough information was provided to show that the processes were commenced before July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because it was commenced before February 4, 1981. 401 KAR 61:132, Existing miscellaneous metal parts and products surface coating operations, does not apply to this point because it is not located in a nonattainment area.

EP20 is subject to 401 KAR 59:010, New process operation, because the process will commence after July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because VMV is not major for VOC.

EP21 is subject to 401 KAR 59:010, New process operation, because the process will commence after July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because VMV is not major for VOC.

EP23 in the EIS is subject to no regulations and is for the petroleum storage tanks. 401 KAR 59:050, New storage vessels for petroleum liquids, does not apply because VMV is not major for VOC or is not located in a nonattainment area. 401 KAR 59:174, Stage II controls at gasoline dispensing facilities, does not apply because VMV is not located in a nonattainment area. 40 CFR 60 Subpart Kb, Standards of performance for volatile organic liquid storage vessels (including petroleum liquid storage vessels) for which construction, reconstruction, or modification commenced after July 23, 1984, does not apply because none of the storage tanks has a capacity greater than or equal to 10,560 gallons (40 m^3). 40 CFR 60 Subpart K, Standards of performance for storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after June 11, 1973, and prior to May 19, 1978, does not apply because none of the storage tanks at VMV were constructed, reconstructed, or modified between 1973 and 1978. 40 CFR 60 Subpart Ka, Standards of performance for storage vessels for petroleum liquids for which construction, reconstruction, or modification commenced after May 18, 1978, and prior to July 23, 1984, does not apply because none of the storage tanks at VMV were constructed, reconstructed, or modified between 1978 and 1984. 401 KAR 61:050, Existing storage vessels for petroleum liquids, does not apply because VMV is not located in a nonattainment area.

EP24 is subject to 401 KAR 59:010, New process operation, because the process commenced after July 2, 1975.

Applicable regulations (continued)

EP25 is subject to 401 KAR 59:010, New process operation, because the process commenced after July 2, 1975. 401 KAR 59:225, New miscellaneous metal parts and products surface coating operations, does not apply to this point because VMV is not major for VOC.

The 2 oil-water separators on the insignificant activity list are subject to no regulations. 401 KAR 59:095, New oil-effluent water separators, does not apply because the petroleum products handled do not have a Reid vapor pressure greater than or equal to 0.5 psia. Additionally, VMV is not major for VOC nor is VMV located in a nonattainment area. 40 CFR 63.104, National emission standards for oil-water separators and organic-water separators, does not seem to apply since the oil-water separators are not part of another part 60, 61, or 63 regulated process.

VMV has indicated that the 10 enclosed washers are subject to 401 KAR 59:010, New process operation. Since VMV has also indicated that the existing washers were installed after July 2, 1975, the division agrees that 401 KAR 59:010 applies to the washers.

PERIODIC MONITORING

Given the control devices used (filters) at EP01, EP09, EP20, EP21, and EP25, there is little chance of violating a mass or opacity standard. For this reason, direct measurements of mass and opacity emissions will not be required but some assurance that the filters are working properly will be needed. First, the emissions must be captured. At EP09 and EP25 capture is assured because the booth is a total enclosure and the only ventilation is through the filters. At EP20 sufficient air movement into the filters assures capture. At EP01 sufficient air movement into the filters would have assured capture if holes had not been cut in the sides of the booth. For this reason, monitoring to make sure the holes are covered is required at EP01. Since EP21 doesn't assure capture through a constant configuration, smoke tube observations are being used to assure capture. Once the emissions have been captured, the filters will assure compliance with mass and opacity standards at EP01, EP09, EP20, EP21, and EP25. At EP09, monitoring pressure drop daily across the filters (when active) will demonstrate proper operation. If the other filters are inspected to determine if replacement is needed each time painting is done, there is little chance that the filters won't work.

Low spray can and gun pressures and gravity make direct measurement of mass and opacity emissions a low priority at EP02. Low can and gun pressures prevent PM emissions into the open air which allows gravity the time it needs to remove most of the PM from the air. Unless average usage is extremely high (above 8 gal/hr), there is little chance for violation of these standards.

Until the water wall at EP09 is replaced, monitoring to assure proper operation will be used to demonstrate compliance with mass and opacity standards that apply. There is little chance of violating mass or opacity standards if the control device is working properly. For this reason, direct measurements of opacity emissions will not be required when operating properly and direct measurements of mass emissions will not be required unless the average paint usage rate exceeds the operating limit in the permit. However, some assurance that the water wall is working properly will be needed. Monitoring water wall sheeting and system vents once every 8 hours, when painting is performed, will be used to assure that the control device is working properly.

PERIODIC MONITORING (CONTINUED)

Given the control devices used (filters and cyclones) at EP03 and EP04, there is little chance of violating a mass or opacity standard. For this reason, direct measurements of mass and opacity emissions will not be required but some assurance that the filters are working properly will be needed. First, the emissions must be captured. This is assured because EP03 and EP04 use closed systems. Magnahelic gages will be used to assure proper operation of the control devices. By monitoring pressure drop once per shift when active, the possibility of differing operating conditions is minimized and proper control device operation is assured.

EP05 and EP24 are controlled by baghouses and when operated as designed there is little chance of violating mass or opacity standards. For this reason, direct measurements of mass and opacity emissions will not be required but some assurance that the baghouses are working properly will be needed. Magnahelic gages will be used to assure proper operation of the baghouses. By monitoring pressure drop once per shift, proper operation is assured (the baghouse operation will change little between shifts).

EP06, EP07, and EP18 are uncontrolled and may have the potential to violate mass and opacity standards. Given the highest applicable AP-42 emission factor for welding and the 75% assumed control efficiency for any semi-enclosed building, EP06 will not violate any mass standards. It is doubtful that EP07 will violate any mass standards given the maximum usage rate of the burner and AP-42 emission factors. Given the test results from a different source for the same engines tested at VMV and the maximum hourly usage of diesel in the tests, it is doubtful that EP18 will violate any mass standards. However, possible opacity violations are unknown for EP06, EP07, and EP18. Given the nature of the processes, it is likely that some opacity will be observed. For this reason varying degrees of visible emission monitoring are being required. The monitoring has been set up to be representative of the continuous emissions.

All natural gas combustion is extremely unlikely to violate mass and opacity standards.

Since EP11 only has fugitive emissions, visible dust beyond the property line is the only concern. No source monitoring will be required since community complaints will serve as monitoring. Recordkeeping and inspector response to complaints should easily confirm this type of monitoring.

As long as the enclosed washers on the insignificant activity list are operated and maintained properly mass and opacity standards are in little jeopardy of being violated. The enclosed washers are only vented after the process is finished (only residual water and NaOH remain). This residual is not enough to quantify and although 401 KAR 59:010 applies, nothing beyond proper operation and maintenance is warranted.

EMISSION AND OPERATING CAPS DESCRIPTION:

Source wide limits in the permit have been accepted so that the source is minor. Because of the limitations, none of the changes performed at the source since October of 1999 have increased the source's potential to emit. See Section D of the permit for more details.

CREDIBLE EVIDENCE:

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.